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Recent Tests of Seedlings versus Transplants

by

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Field performance tests in Ontario of different age classes of planting stock have been conducted in varying degrees since 1957. During that period many experimental plantations were established across the province to compare the survival and growth of different age classes of several species. Reviews of both silvicultural and economic aspects have shown the extent of the differences (Mullin 1968, Mullin and Howard 1973). The most recent published comparisons from these early tests and a few others have been the plantation performance records by species: white spruce (*Picea glauca* (Moench) Voss), red pine (*Pinus resinosa* Ait.), white pine (*Pinus strobus* L.), black spruce (*Picea mariana* (Mill.) B.S.P.) and jack pine (*Pinus banksiana* Lamb.). These have appeared in Forest Research Notes 15, 16, 18, 19 and 20 respectively (Mullin 1978a-d, 1979). Subsequently, as different age classes have been made available, small field plantings (2000-6000 trees) have been made to monitor changes in nursery practices. These have been used to assess the validity of earlier differences found between age classes and the relevance of this information to current production. The early (2 to 5 years) survival and growth of several such experiments are reported here.

Procedure

One test of 2+0, 3+0 and 1½+1½ white spruce from Midhurst Nursery was planted in 1977 at the Midhurst Research planting area. This consisted of a 'clover plant' on a clay loam using the wedge method of planting in White Dutch clover, and a 'cultivated plant' on a sandy loam with the wedge method in disced and harrowed bare soil. Both plantings were randomized and replicated with 2000 trees of each age class being planted. The former plant was left without further treatment (no spray or mowing), the latter was cultivated through 1977 and 1978 with a mechanical scuffler.

Another test of 3+0, 1+2 and 2+2 red pine was established in 1978 with similar treatments (in clover versus cultivated through 1978 and 1979). In addition several other experiments have included, when available, different age classes in storage and planting studies.

Results and Discussion

The results of the first two experiments mentioned above, as shown by second-year survival and terminal growth (current year's leaders), have been summarized in Table 1. In the white spruce, the 1½+1½ transplants have produced much more growth than the 3+0 seedlings (in terms of terminal production). However, growth is still in severe check.

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TABLE 1 Survival, terminal length and terminal production (3000 trees/ha x survival percentage/100 x average terminal length) at 2 years after outplanting for age classes of white spruce and red pine[a]

	Clover plant			Cultivated plant		
	Survival %	Terminal length cm	Terminal prod. cm/ha	Survival %	Terminal length cm	Terminal prod. cm/ha
White spruce						
2+0	22.1[a]	3.5	2 320	65.2[a]	6.3	12 323
3+0	21.3[a]	2.2	1 406	75.4[a]	5.7	12 893
1½+1½	62.3[b]	2.6	4 859	99.1[b]	6.4	19 027
Significance[b]	***	NS		***	NS	
Red pine						
3+0	80.0[a]	7.9[a]	18 960	46.6[a]	3.3[a]	4 613
1+2	95.6[c]	11.5[b]	32 982	88.5[b]	8.8[b]	23 364
2+2	91.9[b]	12.1[b]	33 360	82.6[b]	6.5[b]	16 107
Significance	***	*		***	*	

[a] Entries in vertical columns not followed by same letter are significantly different at 5.0% level or better.

[b] NS = not significant; * = significant at 5.0% level; *** = significant at 0.1% level.

TABLE 2 Survival, terminal length and terminal production (3000 trees/ha x survival percentage/100 x average terminal length) at 2 and 5 years after outplanting; adjunctive experiments

	Survival %	Terminal length cm	Terminal production cm/ha	Increase by transplants %
White spruce (Exp. 4-A-4; at 2 years)				
3+0	94.6	15.8	44 840	
1½+1½	96.2	19.6	56 566	26%
Significance[a]	NS	**		
White spruce (Exp. 4-A-1; at 5 years)				
3+0	96.4	24.6	71 143	
2+2	98.8	31.4	93 070	31%
Significance	NS	***		
Red pine (Exp. 15-1-B; at 2 years)				
3+0	84.4	10.8	27 346	
1+2	84.0	15.8	39 816	46%
Significance	NS	***		
White pine (Exp. 4-A-3; at 5 years)				
3+0	68.8	34.5	71 208	
2+2	75.4	38.8	87 766	23%
Significance	NS	**		
Black spruce (Exp. 17-35; at 2 years)				
3+0	89.4	7.1	19 042	
1½+1½	97.8	11.5	33 741	77%
Significance	**	**		

[a] NS = not significant; ** = significant at 1.0% level; *** = significant at 0.1% level.

In the red pine, as also shown in Table 1, both types of transplants have considerably exceeded the performance of the seedlings in survival and growth.

The results of some recent comparisons of age classes in a few other experiments, also under controlled planting conditions, are given in Table 2.

The conclusion may be drawn that the difference in performance between seedlings and transplants favours transplants to the same or greater magnitude as in earlier studies (Mullin 1968, Mullin and Howard 1973).

It is expected that the differences will persist for many years, as previous studies have indicated (Mullin 1980).

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